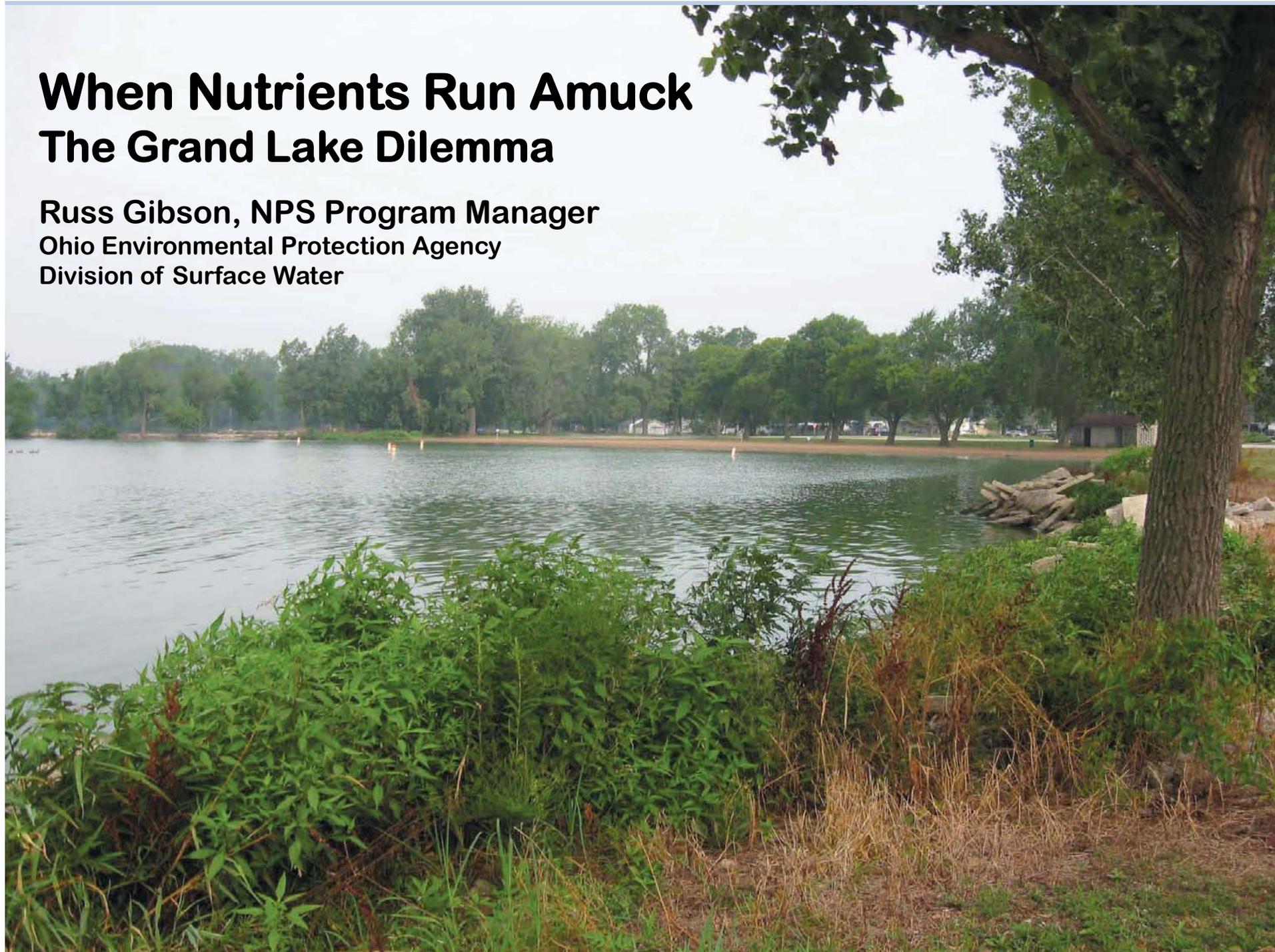


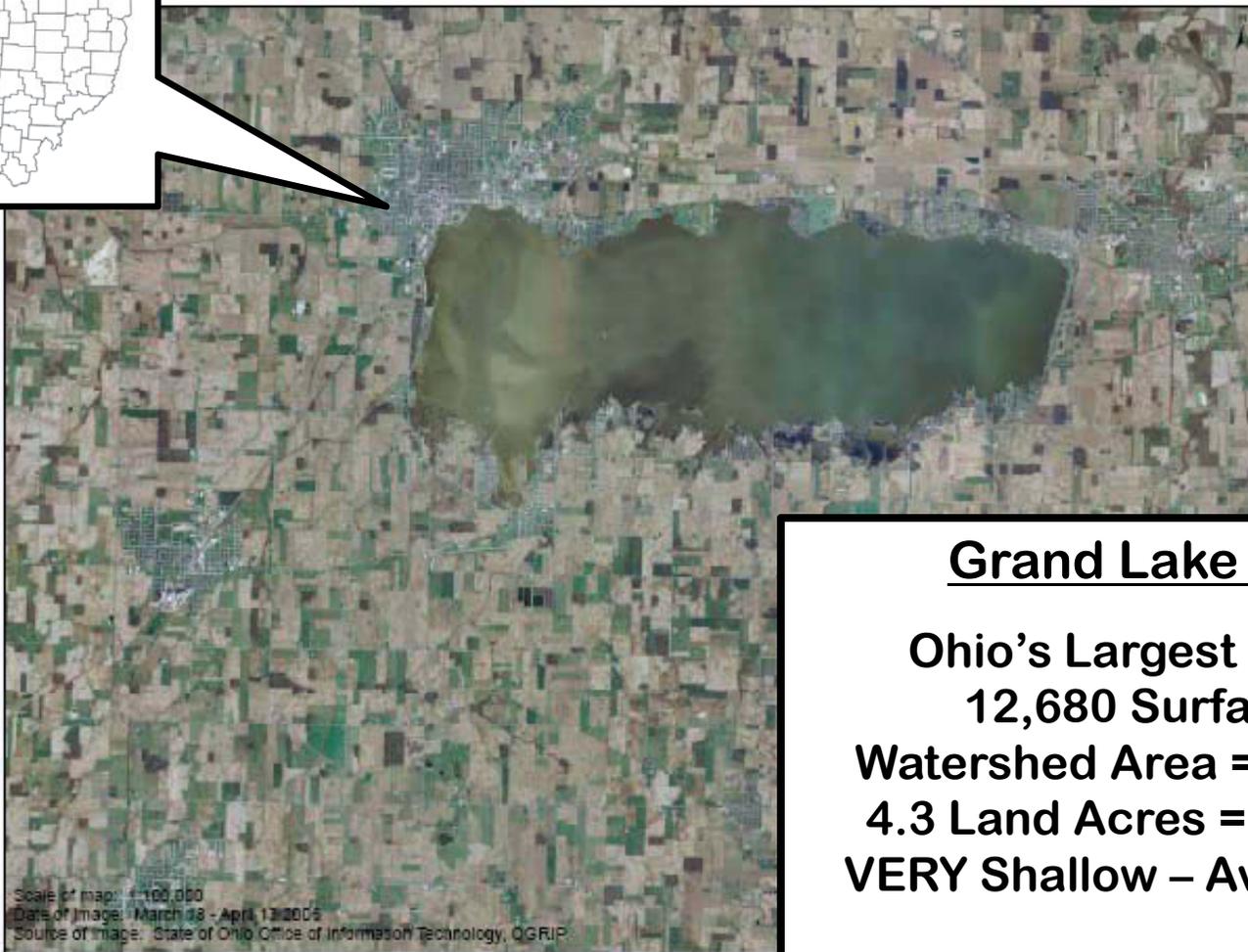
US EPA ARCHIVE DOCUMENT

When Nutrients Run Amuck The Grand Lake Dilemma

Russ Gibson, NPS Program Manager
Ohio Environmental Protection Agency
Division of Surface Water



Grand Lake St. Marys



Grand Lake St Marys

Ohio's Largest Inland Lake
12,680 Surface Acres
Watershed Area = 54,000 acres
4.3 Land Acres = 1 Water Acre
VERY Shallow – Average 5-7 feet

Scale of map: 1:100,000
Date of Image: March 28 - April 13, 2005
Source of Image: State of Ohio Office of Information Technology, QGRIP

Importance of Grand Lake to the Community

Public drinking water supply

100 fishing tournaments /year

**Lake-based tourism accounts for
up to \$150 million annually.**

**Grand Lake State Park enjoyed
by more than 700,000 visitors
each year.**

**Very important focal point for the
community.**





**Grand Lake St. Marys
June 2010**



Algae – it's more than just ugly!

Environmental Impacts

- Horrible Odor
- Waterfowl and Pet Deaths
- Severe Dissolved Oxygen (DO) Swings

Public Health Impacts

- 23 Suspected Illnesses
- Recreation and Boating Advisory
- Fish Consumption Advisory

Economic Impacts

- \$150 Million Tourism Industry Decimated
- Park Revenues down >\$250,000/yr
- Lakeside Businesses Closed

So ... what's feeding this stuff?



GLSM Tributary Phosphorus Concentrations March 7, 2011

GLSM Spillway Discharge
81 $\mu\text{g/L}$ Phosphorus

Coldwater Creek
455 $\mu\text{g/L}$ Phosphorus

Prairie Creek
476 $\mu\text{g/L}$ Phosphorus

Big Chickasaw Creek
455 $\mu\text{g/L}$ Phosphorus

Barnes Creek
322 $\mu\text{g/L}$ Phosphorus

Beaver Creek
189 $\mu\text{g/L}$ Phosphorus

Little Chickasaw Creek
578 $\mu\text{g/L}$ Phosphorus

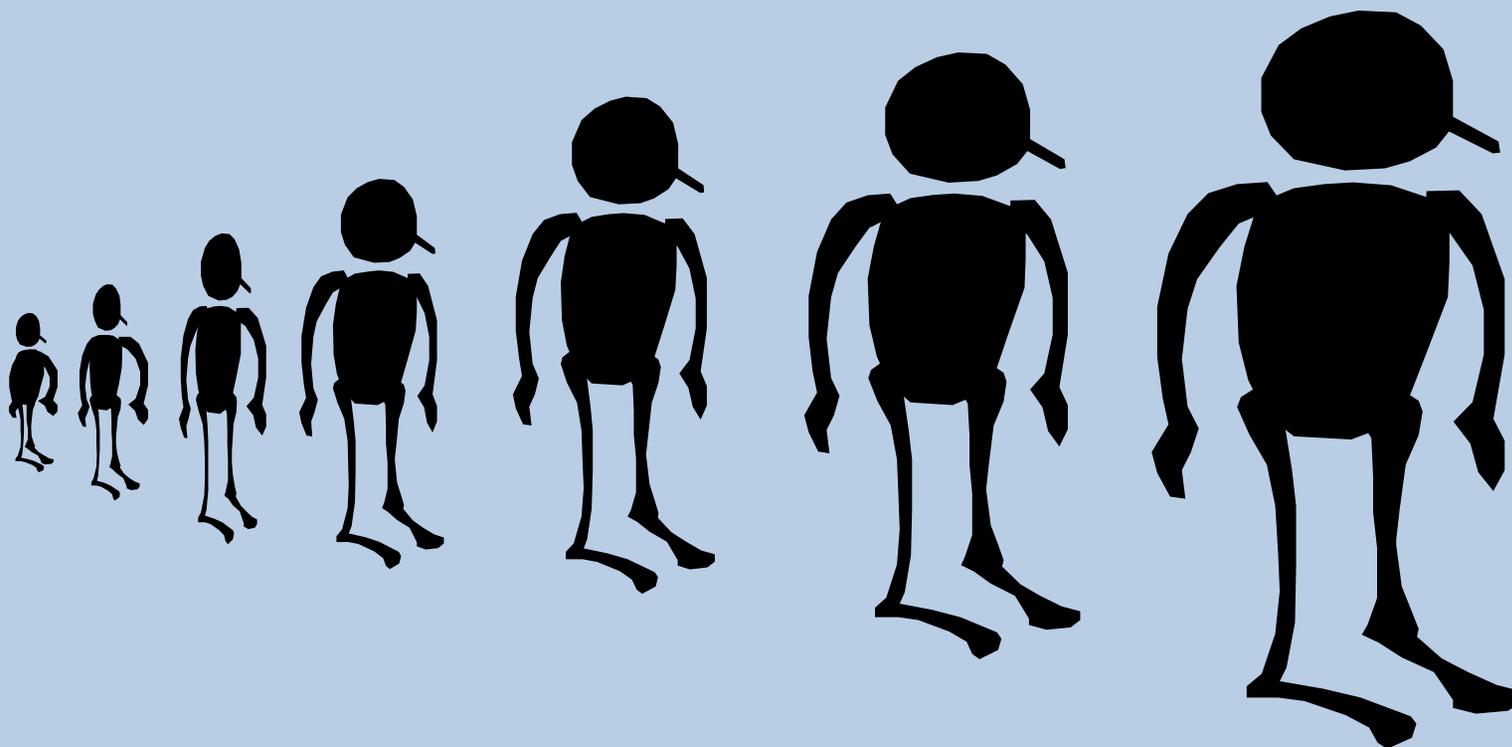
A typical Ohio stream with a mixture of land uses has a spring phosphorus concentration of $<50 \mu\text{g/L}$

So ... where is it all this stuff coming from?



“Doggone it, there’s just so many of us”

**Dave White, Chief of USDA-NRCS
March 11, 2011**



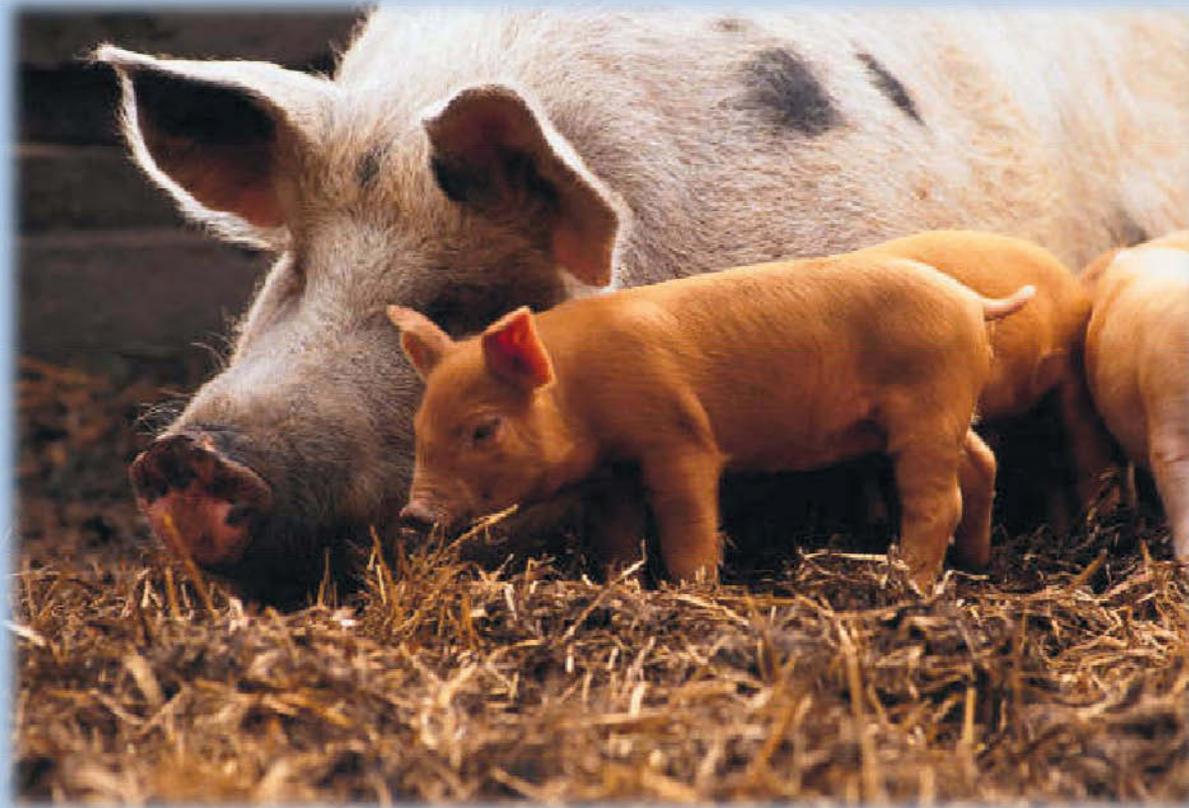
**The 2010 census identified 40,924
people living in Mercer County, Ohio.**

... on the other hand ...



80,000 cows live in Mercer County.

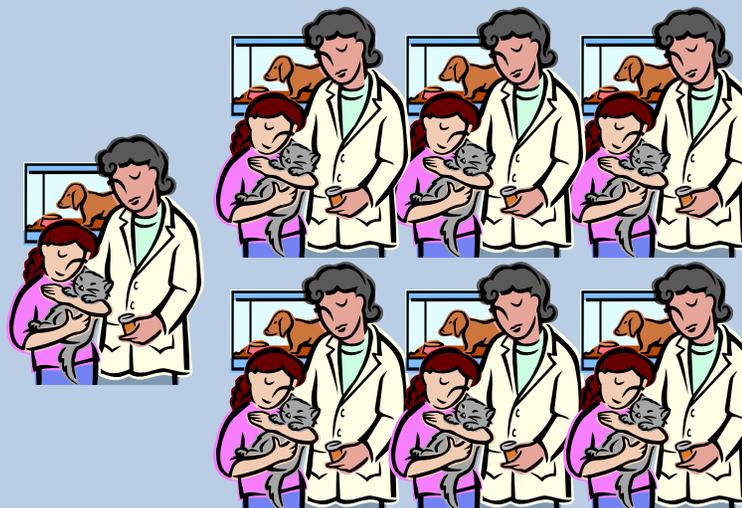
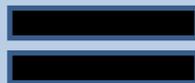
and



273,000 hogs

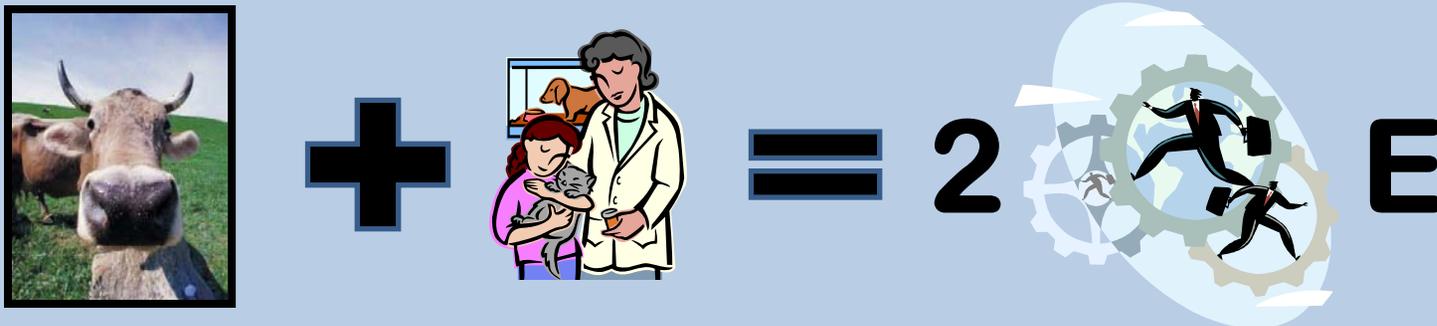


**... and ...
9.3 million chickens**



“One cow equals 14 to 18 humans in terms of phosphorus waste generated each day at 50 pounds of solid waste and 5 gallons of urine” ...

Dr. Harry Gibbons, Tetratech



Mercer County is producing daily phosphorus waste that is comparable to a population density of 1904 people/mile².

FRANKLIN County, is the third-most densely populated counties with 1980 people/mile²

Franklin County is home to one of the largest wastewater treatment facilities in the state.



“Lake water quality problems related to nutrient and algae control appear better resolved through reduction of nutrient loads to the lake and in particular control of agricultural and livestock waste sources.”

Louisville District Corps of Engineers
Department of the Army

August, 1981

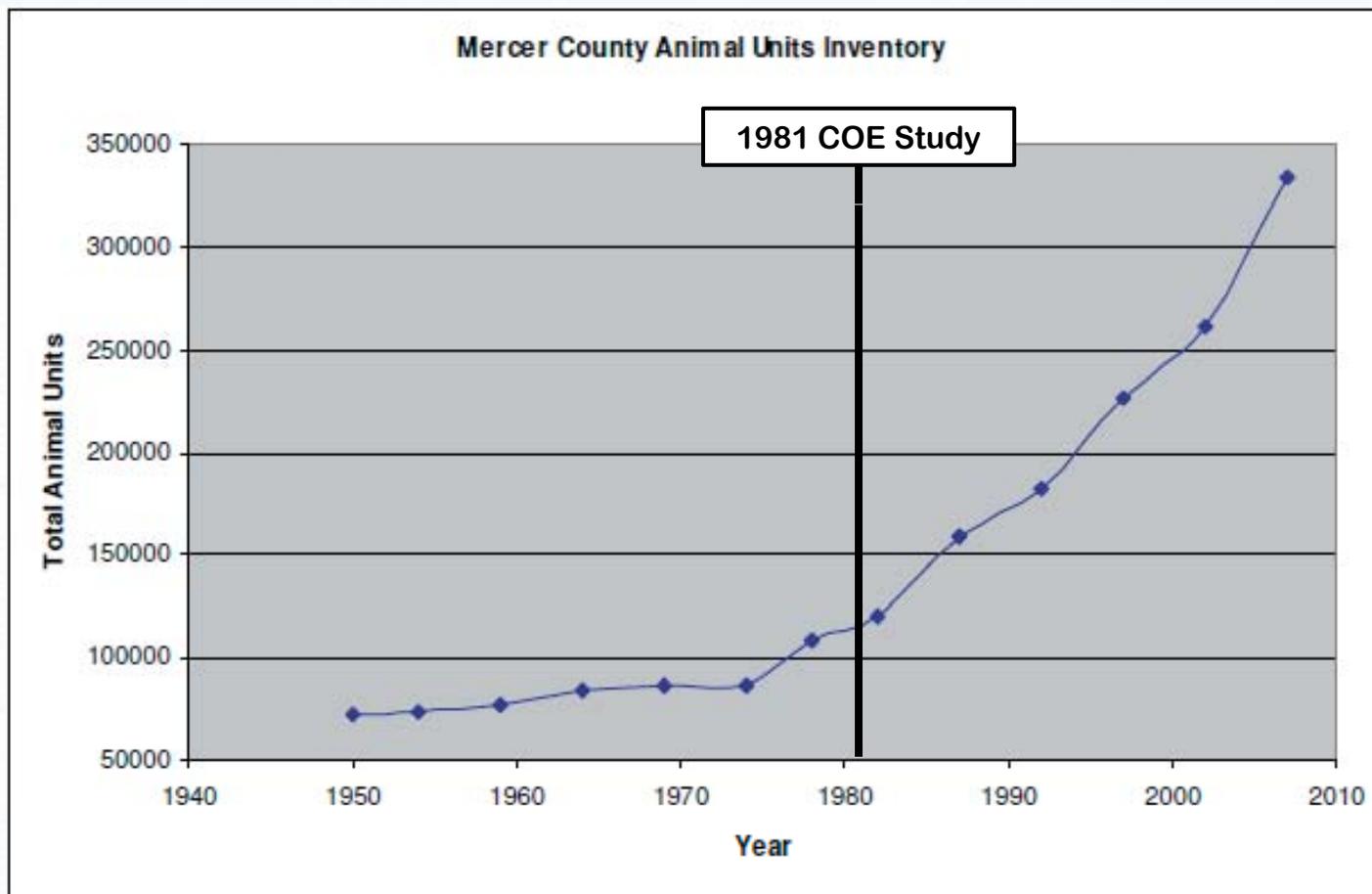
What's Changed?

Since 1980, the human population of Mercer County has grown just 6.7% to 40,924.

Since 1980, the large animal population has more than **TRIPLED** in the county.

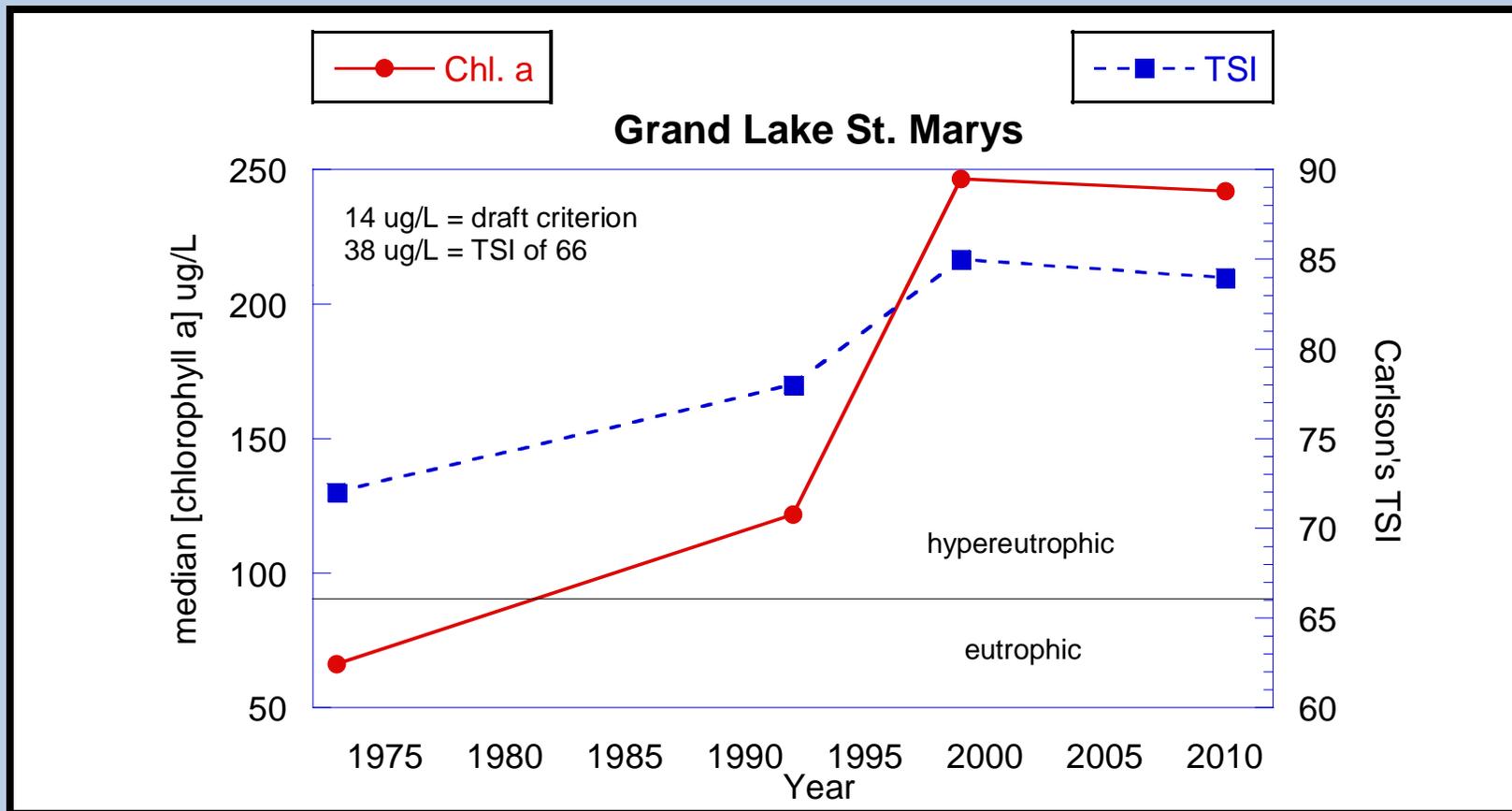
It was shortly thereafter that the assimilative capacity of the lake was exhausted.

Mercer County Livestock Numbers



Source-ODNR

GLSM historical levels of chlorophyll-a and trophic state index



January 18, 2011

ODNR Declares Grand Lake St. Marys Ohio's FIRST "Distressed Watershed"

- All producers of >350 tons manure per year must comply with nutrient management plans.
- Prohibits winter manure application
- Manure application based on P-Index tests



← Grand Lake

Creek/Ditch

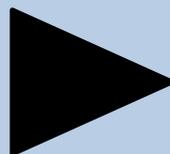
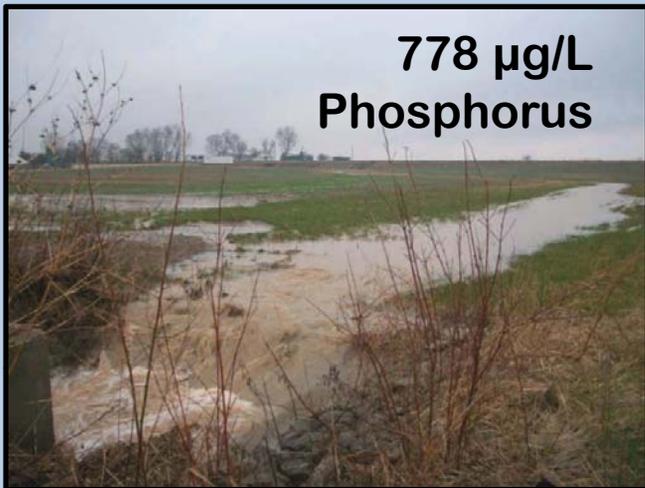


Poo

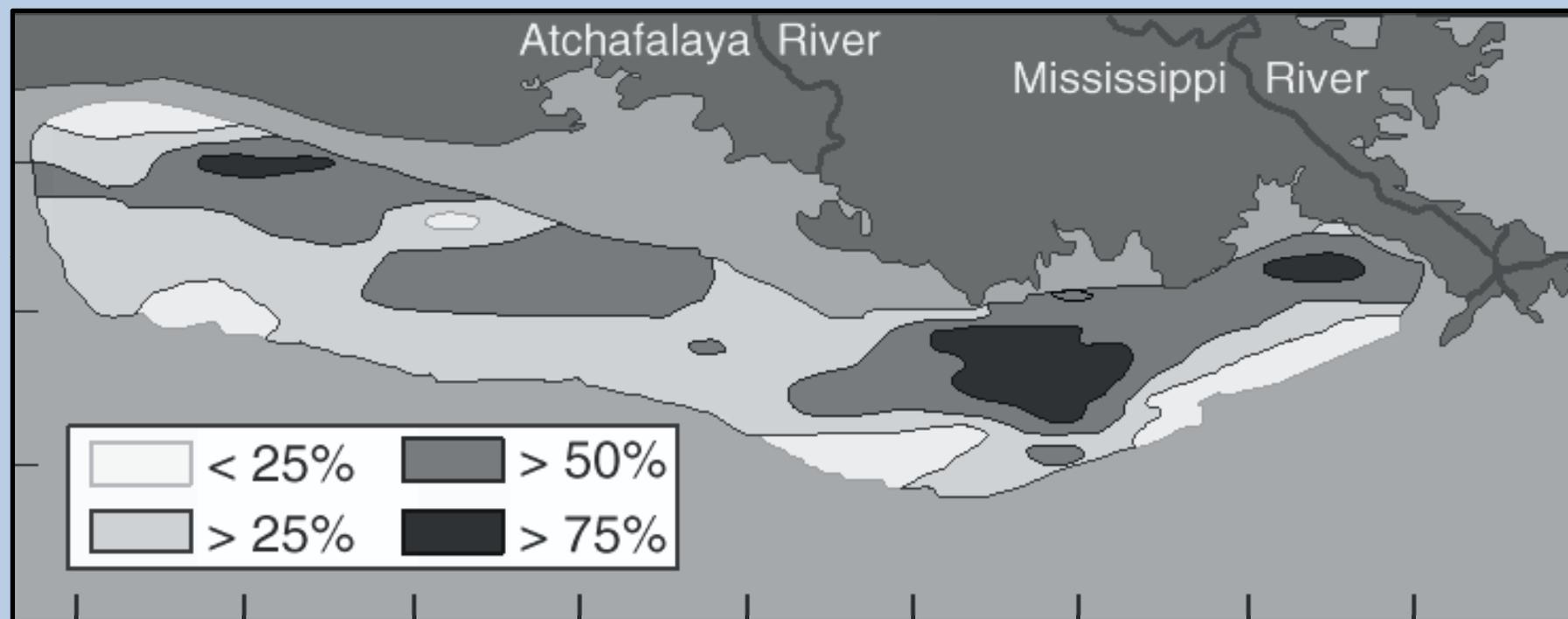


February, 2011

Voluntary Adoption—Is it Working?



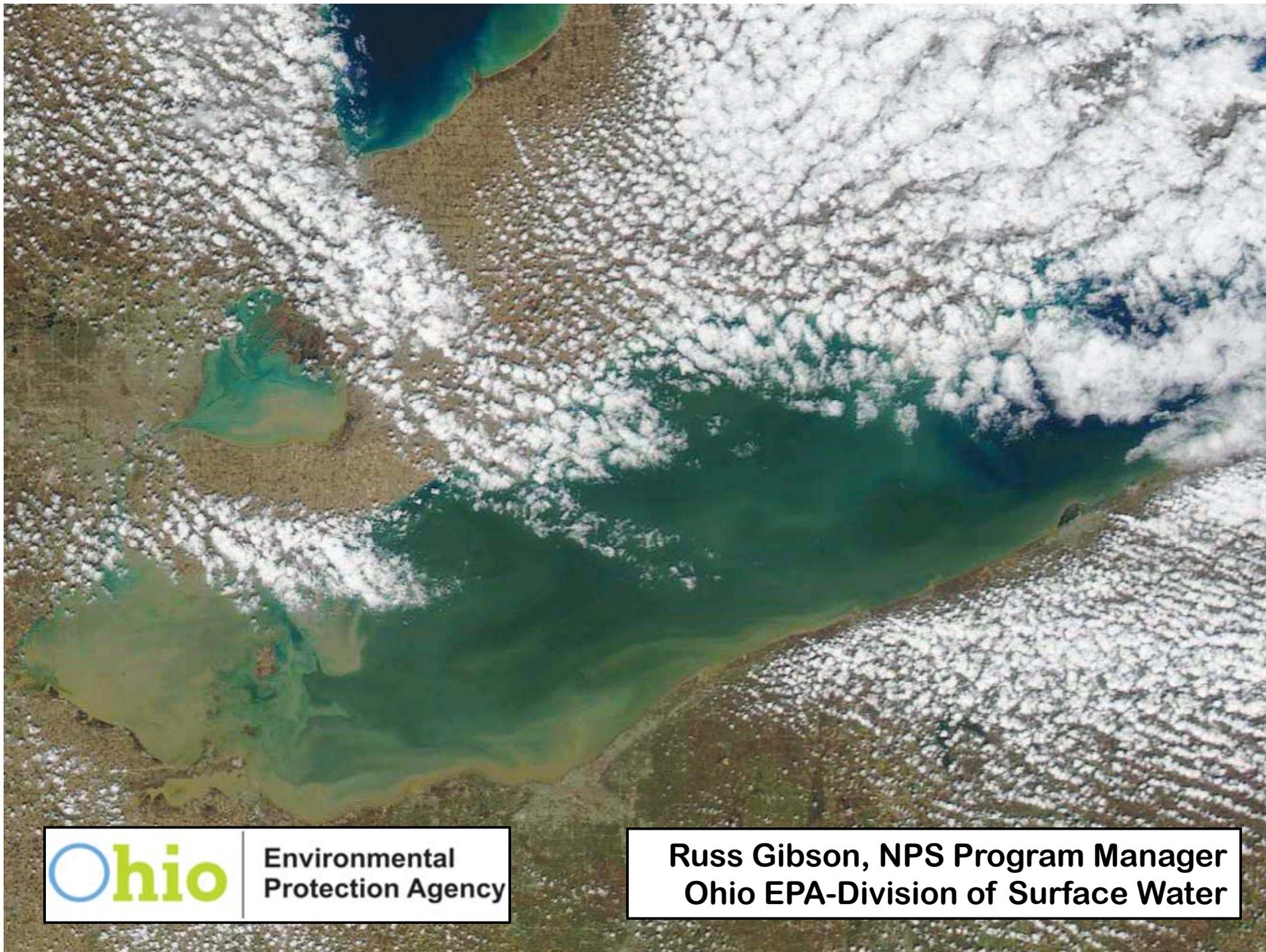
Despite spending more than \$1 billion since 2000 on BMPs and land set-asides in the Mississippi watershed, the Gulf hypoxic zone has expanded every year since.



How can doing more of the same result in anything but more of the same?

What is REALLY needed for successful NPS Nutrient Reduction

1. A “landscape vision” for nutrient management
 - ❖ Sustainable agricultural systems
 - ❖ Nutrients applied ONLY at agronomic rates rather than using the land as a disposal system
 - ❖ Focus BMPs where they may actually make a difference
2. A future NPS regulatory framework.
 - ❖ Acknowledge current practices are not sustainable
 - Livestock AND croplands are causing off-site impacts
 - ❖ Initiate discussions for future authorities



**Russ Gibson, NPS Program Manager
Ohio EPA-Division of Surface Water**